



August 10, 2009

Green Seal is in the process of revising the Environmental Standard for Compact Fluorescent Lighting, GS-5. Comments from the public were solicited on a Proposed Revised Standard at the end of 2007.

Included in this document are the comments received on the Proposed Revised Standard with responses and explanation on how the Proposed Standard was modified accordingly.

By participating in Green Seal's standard setting process, the following organizations that provided comments played an important role in Green Seal's effort to encourage the design, manufacture and end use of environmentally superior products. Their assistance and involvement is greatly appreciated.

National Electrical Manufacturers Association
Minnesota Pollution Control Agency
OSRAM SYLVANIA
Green Purchasing Institute and Product Policy Institute
Hawaii Department of Business, Economic Development & Tourism
Toxics in Packaging Clearinghouse

Project documents are available on the web site, including the Proposed Revised Standard these comments relate to and the Draft Final Revised Standard referred to in the responses: http://www.greenseal.org/certification/g5_cfl_stdrev.cfm

1.0 Scope

This Standard establishes environmental requirements for energy efficient lighting. This includes those lamps used for general illumination purposes, and can include those for some special purposes such as germicidal and bug-a-way lamps. The product group includes those with both screw based and pin based lamps and those with integrated and non-integrated ballasts.

Comment:

Section 1.0: Scope: There are a few terms in this section, as well as throughout the document, that do not match current terminology. In this section, for instance, “bug-a-way” lamps are generally called “bug lamps” and “integrated and non-integrated” are generally referred to as “integral and non-integral.”

Response:

These terms are noted and will be corrected in the Draft Final Revised Standard.

This Standard establishes environmental requirements for compact fluorescent lamps. This includes those lamps used for general illumination purposes, and can include those for some special purposes such as germicidal and bug lamps. The product group includes those with both screw based and pin based lamps and those with integral and non-integral ballasts.

Comment:

1.0 Scope

The scope of this standard needs to be clarified. The scoping document indicates that it broadly includes “energy efficient lamps”. But the criteria in the standard apply only to a small subset of energy-efficient lamps. It would be more appropriate to state that scope of the standard includes self-ballasted and non-self-ballasted compact fluorescent lamps. Implying that these standards would apply to all “energy efficient lamps” would be misleading and inappropriate since many of the standards for other types of fluorescent lamps would be much different.

The Green Seal standard should also apply to cold cathode CFLs, which tend to have a much longer rated life than regular CFLs.

Response:

The intent of the standard was to provide a framework for technologies beyond CFLs to be included in the future. However, since the standard is clearly intended for CFLs the scope will be revised as suggested and read as follows:

This Standard establishes environmental requirements for compact fluorescent lamps. This includes those lamps used for general illumination purposes, and can include those for some special purposes such as germicidal and bug lamps. The product group includes those with both

screw based and pin based lamps and those with integral and non-integral ballasts.

Comment:

1.0 Scope

The Green Seal standard should ensure environmentally and socially responsible manufacturing among companies offering lamps that are qualified under this standard.

Green Seal should require qualifying manufacturers to actively participate in the Electronic Industry Code of Conduct (see www.eicc.info) and to provide their factory monitoring reports to Green Seal to see whether there are potential sweatshop abuses there. Approximately 75 percent of the global production of CFLs taking place in China, according to a paper published by the US EPA and the China Certification Center for Energy Conservation Products; see http://www.rightlight6.org/english/proceedings/Session_13/Opportunities_and_Issues_Surrounding_International_Harmonization/f053banwell.doc. And despite the existence of national labor laws in China, factory workers' rights are often violated. The China Working Group reported the following in 2004:

Workers are often required to work far more than 40 hours a week, have few days off, are paid below minimum wage, and are not paid required overtime. Improper deductions from wages are common. Some Chinese workers must pay a large sum of money as a "deposit" to their employer, and they may have to pay a "recruitment fee" in order to be hired. These payments can prevent workers from leaving jobs where their rights are violated. Physical abuse of workers, and dangerous working conditions, are also common.

See "Beyond Codes of Conduct: Addressing Labor Rights in China," China Business Review, www.chinabusinessreview.com/public/0403/rosoff.html.

Green Seal could further help facilitate oversight of potential environmental violations and sweatshop abuses at fluorescent lamp manufacturing plants by requiring each product to list the factory name and location. That way, if information about various factories surfaces in the news or reports from environmental organizations or government regulatory agencies, consumers will be able to match it up to products it is considering buying.

Response:

Green Seal conducts site audits of manufacturing facilities not only to ensure that the criteria in the standard are met, but also that manufacturing laws and regulations are followed. As a result, if a product is manufactured in China, the audit would be done in China. This information is typically included in the standard's forward, but will also be included in the standard's requirements. Further, based on the suggestion, Green Seal will include the criteria established

by the Electronic Industry Code of Conduct as part of the audit. This will be cited in a new criterion as follows:

Compliance to Laws and Regulations. The product shall be produced in compliance with applicable law and regulations.

Code of Conduct. Manufacturers shall have a code of conduct program in place to encourage safe conditions, worker rights and environmental responsibility in the global electronics supply chain. The program shall include the criteria established by the Electronic Industry Code of Conduct.

2.0 Definitions

General comments about definitions or ideas for missing definitions. Comments on specific definitions included in the proposed revised standard should be put under that header.

Comment:

Request the following definition for "incidentally present" be added to the standard. This term is included in the proposed revisions to Section 6.4 submitted. This definition is consistent with the Model Toxics in Packaging Legislation on which the laws of 19 U.S. states are based.

Incidentally Present: The presence of a restricted substance as an unintended or undesired ingredient of a package or packaging component.

Response:

This language used for the packaging section followed the CONEG model and does not require/use the term incidentally present, thus it does not need to be defined. The concept is included in the term, intentional introduction.

2.1 Compact Fluorescent Lamp

A fluorescent lamp of with a single base which performs the entire mechanical support function. Bulb shape may be tubular, multi-tubular, twister or spiral, Reflector, Globular, decorative (candle) or shaped similarly to a conventional incandescent lamp.

Comment:

The fourth word in the definition, "of," should be deleted

Comment:

2.1 The definition of Compact Fluorescent Lamp does not make sense and should be differentiated from other fluorescent lamps

Comment:

2.1 This definition would include u-bend lamps and circline lamps as IEC and ANSI now call these single based. Is this intended? The definition for ballast adaptor has been deleted but the term is still used in the document. Similarly, there are terms in the document that should be defined, such as “start” in section 4.3.

Again, words such as “twister” in 2.1 are inconsistent with industry-recognized terminology (“twist”).

Response:

The definition for Compact Fluorescent Lamp has been modified to reflect the suggestions. The definition of ballast adaptor was updated and will be added to the Draft Final Revised Standard.

Compact Fluorescent Lamp: A fluorescent lamp that is small and compact and performs the entire mechanical support function and may be self-ballasted or function with a ballast adaptor.

Ballast Adaptor: A unit that contains all elements that are necessary for starting and stable operation of the lamp, with an integral socket for a lamp.

2.3 Fluorescent Self-Ballasted Lamp

A compact fluorescent electric lamp unit that incorporates, permanently enclosed, all elements that are necessary for starting and stable operation of the lamp, and which does not include any replaceable or interchangeable parts. The unit including all elements is discarded at the end of the lamp life.

Comment:

2.3. The definition of a Fluorescent Self-Ballasted Lamp should not include the word compact (or conversely the definition should be for a Compact Fluorescent Self-Ballasted Lamp).

Response:

The definition will be updated as follows:

Self-Ballasted Lamp: A unit that incorporates, permanently enclosed, all elements that are necessary for starting and stable operation of the lamp, and which does not include any replaceable or interchangeable parts. The unit including all elements is discarded at the end of the lamp life.

2.6 Post-Consumer Material

Finished products, packages or materials generated by a business or consumer that have served their intended end uses, and that have been recovered from or otherwise diverted from the waste stream for the purpose of recycling.

Comment:

2.6 The definition of Post-Consumer Material should explicitly exclude a business that is the original manufacturer. Otherwise, that would be considered post-industrial recycled material.

Response:

The definition will be updated as follows:

Post-Consumer Material: Material that would otherwise be destined for solid waste disposal, having completed its intended end-use and product life cycle. Post-consumer material does not include materials and by-products generated from, and commonly reused within, an original manufacturing and fabrication process.

2.8 Recoverable Material

Material that has been recovered from or otherwise diverted from the waste generated after a material manufacturing process. Recovered material may include post-consumer material, cuttings, trimmings, obsolete inventories, and rejected unused stock, but does not include material capable of being re-used within the process that generated it.

Comment:

This might be a good place to say, "Incandescent lamps use 13X as much packaging, as compact fluorescent lamps last 13X longer."

Response:

This is useful background information; however this term is being defined to provide clarity on what is meant by this term and the comparison of amount of packaging is not needed for that purpose.

2.9 Recyclable Packaging

The package can be collected in a substantial majority of communities, separated or recovered from the solid waste stream and used again, or reused in the manufacture or assembly of another package or product through an established recycling program.

Comment:

Consumer Recyclability of Lamp Packaging

In the Background Section of the proposed standard, it is noted that, one, plastic

packaging must have 25 percent post-consumer content and, two, “all packaging must be recyclable.” The latter is defined in Sections 2.9 and 6.1 of the proposed standard.

These two conditions are not compatible at this time. Most residential recycling programs in Minnesota and elsewhere in the US accept only #1 and #2 plastic containers with necks or threads. Post-consumer plastic lamp packaging is typically #1 or #3 clamshell or sheet material and it is not generally accepted in Minnesota’s recycling programs, nor is it generally accepted in recycling programs across the country.

We are concerned that lamps may be Green Seal-Certified and packaged with material that theoretically meets a recycling standard, but in reality none of it is recycled. This defeats the purpose of the Certification and the standard. We recommend that Section 2.9 of the proposed standard include specific responsibilities and verifiable standards and criteria for the determination that CFL packaging can be and will be recovered and recycled in communities in Minnesota and across the country.

Comment:

2.9 – Recyclable Package: The definition is vague. What is a “substantial majority of communities?”

Response:

The definition used for recyclable package is consistent with the Federal Trade Commission’s definition of recyclable. Thus, it will not be changed. Generally, this refers to paperboard and bottles made of #1 and #2 plastic resin codes.

2.10 Secondary Packaging

Any packaging or material other than primary packaging, including wrappers, boxes, and blister packs, but excluding shipping containers.

Comment:

2.10 – secondary packaging is defined, but primary packaging is not. Furthermore, this definition is confusing. Blister packs, for example, are primary packaging, rather than secondary.

Response:

This definition will be updated and a definition for primary package will be added to the Draft Final Revised Standard as follows:

Secondary Packaging: Any packaging or material other than primary packaging, including wrappers, but excluding shipping containers.

Primary packaging: Package that is the material physically containing and coming into contact with the product, not including a lid.

2.11 System Efficacy

The quotient of the lamp lumen output divided by the power input to the ballast, measured in lumens per watt (a measure of system efficiency).

Comment:

Lastly, “lumens per watt” in section 2.11 is not a measure of system efficiency. It is efficacy.

Response:

Based on other comments, the efficacy and efficiency requirements will fall under compliance to the ENERGY STAR Eligibility Criteria for CFLs. So to be consistent, this definition along with others already defined in the ENERGY STAR Program Requirements for CFLs, will be removed from the Draft Final Revised Standard.

3.1 Efficacy and Energy Efficiency

3.1.1 Average Initial Lumens. Average initial lumen output shall be measured in accordance with American National Standard Institute (ANSI) C78.375-reaffirmed 2003, Fluorescent Lamps – Guide for Electrical Measurement.

3.1.2 Input power. Input power to self-ballasted fluorescent lamps shall be measured in accordance with ANSI C78.375-reaffirmed 2003, Fluorescent Lamps – Guide for Electrical Measurement, measuring true RMS voltage within 1% error, over the frequency range of the measured product. Input power to a compact fluorescent lamp sold in combination with a ballast adaptor shall be measured with the supplied ballast, rather than a reference ballast, as required by IES LM-41-98, IES Approved Method for Photometric Testing of Indoor Fluorescent Luminaries.

3.1.3 Ballast Factor. Ballast factor, as measured in accordance with ANSI C82.2, Methods of Measurements for Fluorescent Lamp Ballasts, shall be included in the rated efficacy of ballast adaptor and conversion kit units.

3.1.4 Efficacy. Efficacy shall be determined with lumen measurements with 50% of samples with the lamp in base-up orientation and 50% of samples with the lamp in the base-down orientation, unless the lamp design is exclusively for one or the other orientations.

Products shall meet the following minimum average efficacies:

Compact Fluorescent Lamps

Lamp Wattage	Lamp Efficacy (initial lumens) (on reference ballast)
<10 watt	50 lumens/watt
10-15 watt	60 lumens/watt

>15 watt 65 lumens/watt

Self-Ballasted Lamps, and Lamp and Ballast when supplied together

Lamp Wattage System Efficacy (initial lumens)

<10 watt 40 lumens/watt

10-15 watt 45 lumens/watt

>15 watt 55 lumens/watt

Comment:

3.1.4 Energy Efficiency and Performance

The standard should require that the product package indicate the “mean” or “design” lumens of the product, not just the initial lumens. This will help consumers find products that will better meet their needs throughout the life of the products. One problem with CFLs is that they commonly experience significant “lumen depreciation”.

Green Seal should set efficiency standards that are higher than those in the ENERGY STAR standard so that it rewards the market leaders. Unfortunately, as proposed, some of the proposed CFL system efficiency standards (measured as initial lumens/watt) are lower than those in the 2007 ENERGY STAR standard (Version 4.0).

Rather than creating a different rating system that aggregates the efficiencies of all types of self-ballasted CFLs within a wattage range, Green Seal should build on the system developed by ENERGY STAR and set higher standards in those categories where clear market leaders can be rewarded. For example, if Green Seal finds that there is a sufficient quantity of self-ballasted CFLs using 10-15 watts that have an efficiency of 60 or above, they should set their standard there. That way, purchasing agents and other consumers can easily set their specifications to state that self-ballasted CFLs should be ENERGY STAR-rated and have a higher efficiency rating. Green Seal should not aggregate the efficacy standards for all types of self-ballasted CFLs (within wattage ranges). Instead, it should set higher standards for bare bulbs (which are inherently more efficient because their light is not shielded by an external covering) than for covered models. This is the approach taken by the Canadian EcoLogo program, Environmental Choice, <http://www.ecologo.org/common/assets/criterias/CCD-014.pdf>. Environmental Choice, for example, sets an efficiency minimum for bare self-ballasted CFLs over 15 watts at 60 lumens per watt and 48-55 lumens/watt for covered bare bulbs.

All Green Seal-certified lamps should be required to run on electronic ballasts. This is consistent with the European Union’s Ecology (the EU Flower) which excludes from its standard any CFLs that are designed to run on a magnetic ballast; see <http://www.greenlabelspurchase.net/882.html>. Magnetic ballasts are much less efficient than electronic ballasts and perform more poorly with flickering, humming and other qualities that make the products undesirable.

Comment:

Efficacy

We welcome your proposals to keep efficacy minimums at a realistic level since other

factors at play, such as correlated color temperature (CCT), have an impact on efficacy. For those self ballasted lamps which have a reflector or other decorative outer envelope, we would like you to consider that this addition inherently reduces the efficacy of the product. Thus we would ask you to consider dropping the required system efficacy by 5 LPW for these product types.

Comment:

3.1 -- Efficacy: The requirements for Self-Ballasted (should be "fluorescent self-ballasted lamps" as this is the defined term) and lamp and ballast when supplied together have not changed from 1997-- is this correct? There are no performance criteria for ballast adaptor/lamp or conversion kit/lamp combinations. Furthermore, there is no test identified to measure efficacy, nor a requirement for a set number of samples, simply that half should be tested in the base-up position and the other half in the base-down position.

Response:

Green Seal has proposed the prohibition of magnetic ballasts by way of prohibiting the use of radioisotopes, along with the other performance criteria not typically achievable by these types of ballasts.

It has been recommended that Green Seal include the ENERGY STAR program requirements (including the testing/method requirements). This will be done in the Draft Final Standard. The efficacy proposed in the updated ENERGY STAR program (version 4.0) are separated for bare and covered and reflector lamps, include self-ballasted and lamp systems, and are higher than those cited by EcoLogo. As a result, the Draft Final Standard will not cite efficacy different from the updated ENERGY STAR criteria. Green Seal's standard however, goes above and beyond ENERGY STAR in many areas to recognize the leaders in the marketplace and provide the tool environmentally responsible purchasers and consumers are looking for.

ENERGY STAR Compliance. Lamps shall meet or exceed the ENERGY STAR Program Requirements for CFLs.

3.2 Lamp Life

The average minimum rated product life span shall be 10,000 hours at 3 hours per start as measured in accordance with IES LM-40-2001, IES Approved Method for Life Performance Testing of Fluorescent Lamps. In units packaged with replaceable lamps, the ballast shall be tested to assure an average minimum rating of 1 lamp life cycle of 10,000 hours, with on going testing to confirm a life expectancy of an average minimum of 4 lamp life cycles, in accordance with IES LM-40-2001.

Comment:

3.2 Lamp Life

We support Green Seal's proposal to set a minimum average lamp life requirement of

10,000 hours, which is higher than that set by ENERGY STAR and is consistent with the minimum lamp-life rating established by Canada's EcoLogo program. A review of the ENERGY STAR database shows that there are approximately 1000 qualified CFLs with a lamp-life rating of 10,000 or more. While most are bare spiral and tube models, the list does include some covered reflectors, globes, A-shaped lamps (similar to common incandescent bulbs), bullets, candles and circular-shaped models. The number of these long-life models that are available has increased over recent years and it is reasonable to expect more to be available in the future.

Green Seal should consider allowing companies to make an additional claim of "Extra long life" for those CFLs that 12,000 or more in order to encourage their use. The EU in its European Compact Fluorescent Lamps Quality Charter has a similar "long-life" designation for models with a lamp life rating of 12,000 hours or more; see <http://re.jrc.ec.europa.eu/energyefficiency/CFL/pdf%20CFL%20quality%20charter/EU%20CFL%20QC%202003%20V4.pdf> (see section 1.5 on package labeling).

Green Seal should consider adding cold cathode fluorescent lamps to this standard, many of which are rated at 15,000 to 25,000 hours.

Finally, the lamp life of compact fluorescent lamps that commonly run on electronic 4-pin ballasts is typically at least 12,000 hours. Therefore, a higher standard should be set for those models. While 2-pin CFLs typically only last 10,000 hours, they should not be eligible for the Green Seal logo because they run on less-efficient magnetic ballasts.

Comment:

Average Rated Life

We disagree with the proposal to raise the average rated life requirement to 10,000 hours for all lamps. While some 10,000 hour models are on the market, we believe that an 8,000 hour rated life is more practical and allows the consumer a broader range of products from which to choose while still providing differentiation from products with lower rated life (6,000 hours or below).

Response:

Cold cathode CFLs are not prohibited in the scope of the standard. Green Seal finds that there are enough leadership products that can achieve the 10,000 average rated life and due to the life cycle benefits of this longer life product, the criterion will not be changed. Further, the suggestion for definition and verification of a claim about "extra long-life" will be added.

Extra Long Life. If the product has an average minimum rated lamp life of greater than 15,000 hours it can make a claim such as "extra long life."

....

3.3 Mercury

3.3.1 Lamps shall contain a maximum of 3 milligrams of mercury per unit.

3.3.2 The manufacturer shall use methods to minimize mercury exposure to workers during product manufacturing. This shall be done with automated dosing of mercury.

Comment:

It should be noted that more mercury from burning 4X the amount of coal is emitted when using incandescents as is contained in a CFL. Further, the mercury landfilled in a CFL is sealed, while the mercury emitted from coal-burning is airborne and subject to inhalation by humans and all other species.

Comment:

Mercury & End of Life

As you mention in your letter, earlier this year NEMA announced a voluntary commitment for manufacturers to cap the mercury content of their CFLs at 5 mg (less than 25 watts) or 6 mg (25-40 watts). This source-reduction commitment is partnered with an active collaborative effort between NEMA, its members, the U.S. Environmental Protection Agency, the U.S. Department of Energy, retailers and other stakeholders to address collection and recycling of spent CFLs.

Based on your accompanying comments, very few manufacturers appear to be able to meet your proposed mercury content requirement. We would suggest that, as a first step, you adopt the existing NEMA mercury content limits. Future revisions to the standard could have tighter limits.

Comment:

3.3 – Mercury

3.3.1 – As you'd previously recognized, NEMA companies set maximum mercury content of compact fluorescent lamps this year of 5 and 6 mg, depending upon wattage. Higher wattage lamps require more mercury. The report that was used to derive this statement in the standard was focused on lower wattage screw-based CFLs. The mercury level set by Green Seal is a random number that is a) below that which was recently agreed upon by NEMA and b) focused on a subset of lamps covered by this standard.

3.3.2 – Requiring automated dosing of mercury is too specific and limits the design and manufacturing process. Manufacturers should have the ability to minimize the mercury exposure to workers using appropriate methods that, in some cases, are already in place but not necessarily automated dosing.

Response:

Mercury remains a manufacturing and end-of-life issue that feasibly can be reduced. A number of major manufacturers have been able to achieve the levels proposed in the standard, which are well-below the NEMA guidance of 5 and 6 mg. After a thorough assessment of products on the marketplace, it was determined that 3 mg represented the leadership practice (with there even being many options available with 2 mg or less). As a result, the criterion will not be

changed. The losses and exposure of mercury to workers during product manufacturing can be minimized with certain manufacturing methods. The current leadership methods include automatic and encapsulated dosing. If other methods are developed that provide the same or better protection and process efficiency (loss minimization) they should be allowed. As a result, the following provision will be added to the criterion:

The manufacturer shall use methods to minimize mercury exposure to workers during product manufacturing. This shall be done with automated and encapsulated dosing of mercury. Other methods of closed, accurate, and precise dosing would be acceptable if proven, with documentation, to have similar or better dose efficiency and protection to worker exposure.

Comment:

Manufacturing Practices for CFLs that Ensure Precise Dosing with Minimum Mercury Levels and Protect Worker Health and the Environment

There are several methods of placing mercury in CFLs. With some of these methods, commonly known as ‘drip’ or ‘spray’ methods, there are significant mercury losses in manufacturing (estimated at fifty percent), with associated worker exposure and environmental release. In addition, it is very difficult to control the amount of mercury that is contained in the lamp at the end of the assembly line.

On the other hand, the ‘pellet’ or ‘capsule’ process allows the manufacturer to control the mercury dose placed in the CFL and use the lowest amount of mercury needed for rated lamp performance and life. With these methods, worker exposures and manufacturing losses of mercury to the environment are minimized.

China’s Environmental Protection Agency (CEPA) and the Natural Resources Defense Council (NRDC) have been jointly evaluating mercury in China’s mining and industrial sectors for several years. A recent unpublished report*1 on mercury use in the Chinese lamp manufacturing sector found that only about twenty percent of CFLs are manufactured with the pellet or capsule controlled dosing methods. The drip or spray method is used for the remaining eighty percent of CFLs manufactured in China.

We strongly recommend that only CFLs made with the pellet, capsule, or other controlled dosing methods be eligible for Green Seal Certification. These manufacturing methods are more technologically advanced, protect worker health and safety, reduce mercury consumption in the industry, eliminate manufacturing losses, and allow much more control of mercury content in lamps. The standard could be structured as a performance standard addressing precision of dose, amount of dose, and overall manufacturing loss, to allow and encourage future innovations in dosing technologies and practices. Consumers have very little ability in the marketplace to evaluate factors such as manufacturing practices in overseas facilities, and rely on programs such as Green Seal certification to accurately identify the products made with the most environmentally advanced practices and materials.

*1 “Survey and Research Report on the Status of Use of Mercury in China’s Electric Light Source Industry.” China Environmental Protection Agency and Natural Resources Defense Council. Unpublished Report. 2007.

Comment:

3.3 Mercury

3.3.1 We support Green Seal’s proposal to set a mercury cap of 3 milligrams of mercury per lamp. This is consistent with the Canadian EcoLogo; see <http://www.ecologo.org/common/assets/criterias/CCD-014.pdf>. Especially since recycling rates for CFLs are so low, it is critically important to encourage CFLs to have the lowest amount of mercury possible, while simultaneously building up the infrastructure for manufacturer-financed lamp recycling.

We acknowledge that US lamp manufacturers have voluntarily agreed to meet the 5 mg mercury cap which has been imposed on them in the European Union. We consider this the baseline that all CFLs sold in the US should meet. However, this should not be considered the leadership standard, which should be lower. The US should take an approach similar to that being taken in the EU, where 5 mg is the maximum for any CFL that can be sold throughout Europe while the EU Flower set a lower standard. (Note: their mercury standard, which is <4 mg, was established in 2002; see http://ec.europa.eu/environment/ecolabel/product/pg_lightbulbs_en.htm#gendescr).

Establishing a mercury-content standard that is more stringent than the NEMA/ENERGY STAR voluntary levels is achievable as evidenced by the fact that it was done by Wal-Mart. In May 2006, Wal-Mart announced that it had negotiated new contracts for low-mercury CFLs sold through its stores and Sam’s Club. The Wal-Mart news release on this achievement states:

To reduce the amount of mercury in its CFLs, Wal-Wart worked closely with its manufacturers GE, Royal Philips, Osram Sylvania and Lights of America. All four suppliers committed to achieving a greater reduction in mercury content than the 5 mg standard set by the National Electrical Manufacturers Association (NEMA) earlier this year. These suppliers will also adhere to clean production techniques that will minimize mercury pollution from factories manufacturing CFLs.

Among the commitments by Wal-Mart’s lighting suppliers include the following:

- GE Consumer & Industrial will reduce CFL mercury content up to 50 percent from NEMA levels in new products, while maintaining the excellent light quality and long life that GE customers expect.”
- Philips currently supplies Wal-Mart with CFLs with mercury contents 40-60% below NEMA’s 5 mg mercury cap;
- Osram Sylvania currently offers CFL reflector lamps at 3 mg and “has committed to reducing the mercury content in all of its CFLs to 4 mg or less by the end of 2007, and to 2.5 mg by the end of 2008”; and
- Lights of America is adopting a new “metal alloy technology hat improves bulb

performance while requiring less mercury per bulb...and the company expects all of its bulbs to have no more than 2 mg of mercury by the end of 2007.”

A copy of this news release is available at [www.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/05-10-2007/0004585479&EDATE=.](http://www.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/05-10-2007/0004585479&EDATE=)

We encourage Green Seal to use its standard to foster greater disclosure of the mercury content of fluorescent and other mercury-added lamps so that consumers can more easily identify products with the lowest mercury-content. We believe this will also increase competition among manufacturers that will result in continuous improvement in the area of mercury reduction. To achieve this, Green Seal should either require manufacturer disclosure (an independent verification) of mercury content as part of their certification and maintain a database of mercury content of the CFLs it certifies or require the manufacturers to print the maximum mercury content on each product package. Currently, fluorescent lamp packaging only voluntarily requires that the lamp package disclose that the product states “contains mercury”. But there is no requirement that it state how much. Therefore, consumers are unable to make informed choices. Product packaging should have mercury content labeling that is similar to nutritional content on food packaging where the caloric content of the product is clearly stated. This helps consumers to be able to comparison shop.

3.3.2 We also support the proposed standard’s requirement that “The manufacturer shall use methods to minimize mercury exposure to workers during product manufacturing.” The language in the proposed standard: “This shall be done with automated dosing of mercury,” however, is not strong enough. Automated dosing assures that the correct amount of mercury enters the lamp, which is important but does not necessarily minimize exposure to lamp workers. That can only be accomplished through the use of encapsulated dosing techniques such as the use of pills, pellets, strips and amalgam. The use of liquid mercury drip and spray dosing methods (even if they are automated) may result in substantial worker exposure to and environmental releases of mercury during manufacturing according to an unpublished 2007 report by the China Environmental Protection Agency (CEPA) and the Natural Resources Defense Council (NRDC). Automated dosing with liquid mercury, which is a common practice, does not necessarily protect workers from volatilized mercury. Both automated and encapsulated dosing of all mercury-added lamps should be required in the Green Seal standard. The CEPA/NRDC report noted that approximately 20% of CFLs are made using encapsulated dosing methods; these lamps constitute the environmental leadership products that Green Seal should be certifying.

Response:

Since there is a mercury limit in the standard, the mercury levels must be disclosed to Green Seal to verify. Rather than having this information on the package, Green Seal can make this information available to purchasers, along with its picogram per lumen hour equivalence. Green Seal agrees with the comments about leadership levels of mercury feasible in products and the

suggestion to include encapsulation methods for delivering mercury during manufacturing and will update the criterion as follows:

The manufacturer shall use methods to minimize mercury exposure to workers during product manufacturing. This shall be done with automated and encapsulated dosing of mercury. Other methods of closed, accurate, and precise dosing would be acceptable if proven, with documentation, to have similar or better dose efficiency and protection to worker exposure.

3.4 Radioisotopes

Lamps shall not contain radioisotopes.

Comment:

3.4 Radioisotopes

We support the proposed standard's requirement that lamps shall not contain radioisotopes, which are dangerous and unnecessary.

Comment:

3.4 – Radioisotopes Not allowing “radioisotopes” eliminates almost all two-pin compact fluorescents from consideration. The requirements should be written to permit two-pin CFL usage.

Response:

The intent of the criterion is to prohibit use of radioisotopes, which present environmental and health concerns, and happen to occur most commonly in magnetic ballasts. Two-pin CFLs are not prohibited in the standard, since electronic ballasts could be developed to work with two-pin lamps. As a result, the criterion will not be changed.

3.5 Lead

Lead shall not be used in the solder components of the lamp.

Comment:

It should be noted that, if lead soldering is used, 13X as much lead is used in incandescents over the same 10,000 life.

Comment:

3.5 Lead

We support the standard's provision that “Lead shall not be used in the solder components of the lamp.” CFLs made with lead-free solder are widely available and increasing as the cost and performance of lead-free solder continues to improve. Green Seal should also require lead-free glass to be used in all of its certified, rather than only

offering manufacturers the option of adding a “lead-free” marketing claim on their packaging when their product is completely lead-free. Several companies now offer CFLs with lead-free glass, including, but not limited to GE Lighting, Neolight, TCP, Inc., and Turolight/Literonics. Some other manufacturers such as Sylvania and Philips offer other types of light bulbs (e.g., incandescent, halogen and high-pressure sodium) containing lead-free glass. In response to this demand, more companies are starting to offer lead-free glass for use in CFL manufacturing. For example, AutoCell Electronics, Inc. (see www.autocell.net), located in Sacramento, CA manufactures lead-free glass for use in CFLs. According to this company’s website, “This state-of-the-art fluorescent tube glass incorporates lithium, in place of lead, to eliminate the toxic effects associated with lead.”

Other hazardous materials. Green Seal should adopt similar restrictions on highly toxic flame retardant chemicals that have been incorporated into the EU Flower’s Revised Ecological Criteria for the Award of the Community Eco-label to Light Bulbs on September 10, 2002. This EU-wide EcoLogo specifically prohibits various brominated and chlorinated flame retardants in plastic parts over 5 grams. It also restricts any other substances known to cause cancer, reproductive harm, or other serious human health or ecological damage. See http://eur-lex.europa.eu/LexUriServ/site/en/oj/2002/l_242/l_24220020910en00440049.pdf.

Response:

The use of lead-free solder is growing and feasible. However, the feasibility of lead-free glass in CFLs is not as advanced and results in limitations for product performance and product availability. As a result, the lead criteria will not be changed. However, a lead-free claim will be available.

Lead. If the product does not contain lead in any component including, but not limited to, the solder and glass, a claim indicating this is permitted, such as “lead-free glass” or “no lead glass.”

The EU prohibition of flame retardants in plastic components over 5 grams will be added.

Flame Retardants. Plastic components weighing more than 5 g shall not contain flame retardant substances or preparations that contain substances that carry the risk phrases R45, 46, 50, 51, 52, 53, 60, 61. In addition, the plastic components weighing more than 5 g shall not contain any of the following flame retardants:

- Decabromodiphenyl 13654-09-6
- Monobromodiphenyl ether 101-55-3
- Dibromodiphenyl ether 2050-47-7
- Tribromodiphenyl ether 49690-94-0
- Tetrabromodiphenyl ether 40088-47-9
- Pentabromodiphenyl ether 32534-81-9

- *Hexabromodiphenyl ether 36483-60-0*
- *Heptabromodiphenyl ether 68928-80-3*
- *Octabromodiphenyl ether 32536-52-0*
- *Nonabromodiphenyl ether 63936-56-1*
- *Decabromodiphenyl ether 1163-19-5*
- *Chloroparaffins with chain length 10-13 C atoms,*
- *Chlorine content > 50 % by weight 85535-84-8*

4.0 Product-Specific Performance Requirements

General comments or idea about product-specific performance requirements.

Comment:

This may be a good place to address the issue of CFL's in can fixtures, where code prohibits vents in the fixtures to prevent ceiling/attic heat exchange. A sealed can traps heat and can generate temperatures above 150F, which degrades lumen output and lamp life.

Response:

ENERGY STAR includes consideration for recessed lights and the elevated temperature typical of their operation. These requirements are now included in the updated version of the Green Seal standard. Further, application exceptions or limitations are required to be on the product label when they are applicable, such not for use in enclosed fixtures.

Comment:

4.0 Product-Specific Performance Requirements

We encourage Green Seal to adopt by reference ENERGY STAR specifications as a baseline for its standard (at least for self-ballasted CFLs). By doing so, Green Seal's standard would automatically be improved whenever the ENERGY STAR specifications are updated. This would support outreach efforts designed to educate consumers to choose ENERGY STAR-qualified CFLs by guaranteeing that all Green Seal-certified self-ballasted CFLs are also ENERGY STAR-qualified. It would also ensure that all of the performance tests referenced in the ENERGY STAR specifications would also be included in the Green Seal standard. (A recently revised version of the ENERGY STAR CFL standard is available at www.energystar.gov/ia/partners/prod_development/revisions/downloads/cfls/Criteria_Version4_122105.pdf.)

Green Seal's performance requirements for self-ballasted CFLs should never be weaker than ENERGY STAR's and, where feasible, should be stronger. Green Seal should simply require additional environmental criteria whenever the ENERGY STAR specifications are not strong enough to guarantee lamps that are considered "market leaders" (i.e., in the top 25% in terms of environmental performance) and there are sufficient products in the marketplace that can meet them. For example:

•ENERGY STAR requires a two-year warranty on all qualified CFLs. Since Green Seal is increasing its lamp life substantially, it should require a longer warranty time of at least 3-4 years. The ENERGY STAR program estimates that a 10,000 hour rated bulb lasts an estimated 9 years. By requiring a longer warranty, consumers will see that the Green Seal-product they are buying offers them a greater value than buying other CFLs. Otherwise, they may not see how these higher standards benefit them and give a preference to Green Seal-certified products.

•ENERGY STAR (and the proposed GS-5 standard in 4.4) both require the mean lumen output (measured at 40% of the lamp's life) to be within 15% of the average initial lumens. Green Seal should go beyond that by setting a maximum lumen depreciation (or minimum lumen maintenance) value for the end of the lamp's life. By certifying only products that don't depreciate quickly after 40% of their rated life, Green Seal could offer an added consumer protection by encouraging manufacturers to design lamps with a minimum lumen maintenance performance throughout a lamp's life.

Response:

Green Seal agrees that the updated ENERGY STAR Program Requirements for CFLs (version 4.0 at the time of this GS-5 revision) addresses most quality and energy efficiency considerations. As a result, Green Seal will require compliance to these requirements. Green Seal's reference to ENERGY STAR will also harmonize the definitions for product quality and energy efficiency. However, there are some criteria included in the ENERGY STAR program that Green Seal will set more strict levels (e.g. lamp life). There are some considerations ENERGY STAR does not include that Green Seal will continue to address. Green Seal's program will continue to include other life cycle consideration such as manufacturing, packaging, and toxics.

Warranty information will be removed from the Green Seal standard since it is covered by ENERGY STAR. Green Seal's standard will have a stricter requirement for the life of the product, lower levels of mercury, and source-reduced packaging (among other attributes), all directly related to the environmental impacts of the product, which provides environmentally responsible purchasers and consumer a significant value.

The ENERGY STAR requirement for lumen maintenance at 40% of average rated life is to be within 20% of initial output. Green Seal will maintain the 15% requirement.

Comment:

In addition, based our initial review of the proposal we believe that several of the technical standards references are either incorrect or out-of-date. We intend to provide correct references in a separate communication.

Response:

Since Green Seal will be referencing the ENERGY STAR program for CFLs, the reference to specific methods have been removed.

4.1 Color Rendering Index

Lamps shall have a color rendering of no less than 80, as measured in accordance with IES 16-1984, Colorimetry of Light Source.

Comment:

Noting the CRI on packaging should be mandatory--this will help consumers select high-quality lamps.

Response:

The labeling requirements in the proposed revised standard includes correlated color temperature, which identifies the color appearance. Including the additional characterization of the color appearance on the objects being illuminated could inform the purchasers. So the measured CRI will have the following labeling requirement:

The Color-Rendering Index shall be included on the product packaging as measured in accordance with the ENERGY STAR Program Requirements and Criteria for CFLs.

4.2 Color Temperature

The correlated color temperature of lamps shall be determined in accordance with IES LM-16-1984.

Comment:

Noting color temperature on packaging should be mandatory, perhaps accompanied by "Warm," "White" or "Cool" to help guide consumer. This will not cost the manufacturer another penny.

Response:

Green Seal will include the Product Package Language requirements in the ENERGY STAR Program Requirements and Criteria for CFLs. These requirements include labeling of the correlated color temperature. The updated criterion in the Draft Final Revised Standard will read as follows:

Primary Packaging Information for Compact fluorescent lamps, self-ballasted lamps, ballast/lamp systems, and conversion kits ENERGY STAR Compliance. Lamps shall meet or exceed the ENERGY STAR Program Requirements for CFLs.

4.3 Operating Temperature and Starting Characteristics

Lamp optimal, minimum and maximum operating temperature shall be determined. Lamps shall start in a smooth manner within 1 second at their minimum rated operating temperature. The Ballast adaptor shall be rated to start and operate in conjunction with the ballast's intended compact fluorescent lamps.

Comment:

4.3 Operating temperature...: What are the criteria for assigning minimum and maximum operating temperatures? Starting? Efficacy? Chromaticity? Other? Typically starting performance is measured at 25C and -10% rated input voltage not at a minimum operating temperature. How is 'smooth' determined? Is it by visual observation i.e. no flicker at start up or other? Also, the term "start" is not defined in the definition section.

Response:

In the Draft Final Revised Standard, Green Seal will include compliance to the ENERGY STAR Program Requirements for CFLs. Green Seal's reference to ENERGY STAR will also harmonize the definitions for product quality and energy efficiency, including starting temperature and starting time. As a result the previously proposed criterion on operating temperature and starting characteristics will be removed.

4.4 40% of Lamp Life

The lamp lumen output measured at 40% of the lamp's life shall be within 15% of average initial lumens.

Comment:

Isn't 15% a bit low? Don't most quality CFL's maintain close to 90% lumen output at the end of life?

Response:

The ENERGY STAR requirement for lumen maintenance at 40% of average rated life is to be within 20% of initial output. Green Seal will maintain the 15% requirement.

4.5 Cycle Life

The lamp cycle life shall be greater than 20,000 when cycled for 0.5 minutes on and 4.5 minutes off for the lamp life.

Comment:

Cycle Life

All CFLs currently sold in the U.S. must meet a minimum cycle life based on a 5 minutes ON/5 minutes OFF cycle. This requirement was part of the EPACT 2005 legislation that took effect on January 1, 2006. Since there are existing Federal requirements, and since it is not clear that the proposed cycle time and cycle life will be any more stringent than the

existing Federal requirement, we propose that the cycle life be removed from the proposed standard.

Comment:

4.5 Cycle life These “cycle life” requirements are directly quoted from the EU and are not applicable in the US. Using these numbers would rule out today’s self-ballasted CFL instant start lamps – nearly 100% of what is sold in the US.

Response:

Since cycle life is addressed in EPACT through the ENERGY STAR program and Green Seal is citing the ENERGY STAR requirements in the Draft Final Standard, the cycle life requirement proposed will be removed.

4.6 Safety

Ballast adaptors and self-ballasted compact fluorescent lamps must meet the minimum safety requirements as evidence by third party certification such as Underwriters Laboratories (UL) listing or its equivalent.

Comment:

I've never read this anywhere, but I believe that the primary safety concern re CFL's occurs immediately after breakage, when the mercury is airborne. Ideally, a warning would read something like: "If this lamp breaks, do not inhale. Move at least 20 feet from the point of breakage, and do not return until at least 20 minutes until mercury has settled. Wipe all surrounding surfaces with a damp paper towel and seal towels in a plastic bag. Wash hands thoroughly."

Response:

The labeling requirements will be updated to include the suggested language:

Mercury. If the lamp does not contain mercury, it does not need to include the mercury labeling requirements in the ENERGY STAR Program Requirements for CFLs. For products that contain mercury, in addition to the requirements in the ENERGY STAR Program Requirements for CFLs, instructions for safe clean up of broken product shall be included. Unless otherwise approved in writing by Green Seal, the description shall read as follows:

- *If lamp breaks, do not inhale. Open window, leave room, and close door behind you. Shut off air system. Stay away for 20 minutes. With gloves or plastic bags to protect hands, scoop up broken material with stiff paper or cardboard and seal in plastic bag or container with lid. Clean area with damp paper towels and seal in a separate plastic bag or container, include gloves. Dispose of properly. Wash hands thoroughly. Do not allow children or*

pregnant/nursing women to help with cleanup. Do not vacuum or sweep.

4.7 Warranty

The manufacturer shall provide a product warranty for at least 2 years from the date of purchase.

Comment:

Manufacturers may resist this as many applications in commercial settings have 24 hour burns, in which case 10,000 hours is reached in 1.3 years. However, it may be that -0-cycles extends CFL life to closer to 17,000 hours, or two years.

Response:

The warranty requirement is being removed since it is covered in the ENERGY STAR requirements included as a baseline for the Green Seal standard.

4.8 Power Quality Designation

The product's power factor and total current harmonic distortion shall be tested measuring true rms voltage to an accuracy of 1%.

4.8.1 Power Factor. Power factor shall be greater than 0.96, leading or lagging.

4.8.2 Harmonic Distortion. Total current harmonic distortion in triplens shall be less than 10%.

Comment:

Power Quality

We do not agree with the proposal to require a power factor of 0.96 since such a high power factor can only be obtained with very special circuitry that has potentially negative implications for CFL cost, performance, and product penetration. Per your comments accompanying the Green Seal proposal, there are no actual issues with low (normal) power factor CFLs, despite their large product penetration. Utilities support the widespread use of CFLs, especially in residential applications, since they realize that even a low power factor CFL presents less overall power system losses to a utility than the incandescent lamp it replaces. This topic may merit further discussion since it is somewhat complicated. One of our members is the U.S. expert on IEC SC77AWG1, which is responsible for the IEC standard you reference in your commentary, namely, IEC 61000-3-2, and he would be happy to have further discussions with you on this subject.

Comment:

4.8 Power Quality Designation Please explain the reasoning behind the selection of the power factor and harmonic distortion levels.

Response:

Electronic ballast CFL's are known to have power quality issues, namely with power factor and harmonic distortion to potentially interfere with electronic and signaling equipment and may cause losses in power. When CFL's are extensively used in a large facility and combined with other electronics, the total impact may be an issue. However, CFL's contribution is likely minimal overall. Electric utilities haven't had power quality issues with CFL's in residential applications, but considering the growth CFL's and of electronic equipment in both homes and offices this may rise as an issue. This standard will be aligned with the ENERGY STAR requirements for CFLs, which includes power factor requirements.

5.1 Lamp Recycling

Manufacturers shall have a program in place to encourage and facilitate recycling of lamps.

- **Information on the package, as pursuant to section 8.1.16.**
- **Recycling program access on the company website**
- **Recycling program information available through customer service**
- **Provide a take-back program. This take-back program shall at a minimum accept lamps returned by customers and send such lamps to a local recycling program.**

Comment:

The idea of mandatory recycling at the end of life is expensive and wasteful. The amount of mercury is miniscule, and in a landfill, the mercury is sealed. Mercury is harmful when airborne or in water consumed by humans and other animals.

Comment:

We support the proposed Green Seal requirement that manufacturers "provide a take-back program" but feel that it needs to be clearer that the program should not simply deliver the lamps to a municipal recycling program. Instead, mercury-containing lamps should be managed through an industry-funded and/or operated lamp recycling program. Sending fluorescent lamps "to a local recycling program" is unfair to local governments, many of which do not have the resources to handle large quantities of mercury-containing lamps, and will not achieve the goal of encouraging manufacturers to redesign their lamps to be less-toxic, longer lasting or more easily recyclable.

Local governments across the United States have been saddled with an extraordinary burden of creating an expensive collection, recycling and disposal infrastructure for fluorescent lamps as well as other hazardous materials such as computers, batteries and thermostats. In contrast, manufacturer-financed fluorescent lamp recycling programs have been developed in other countries. For example, under the European Union's Waste Electrical and Electronic Equipment (WEEE) Directive, manufacturers are responsible for setting up and financing recycling programs for lighting equipment (including CFLs) and reaching a recovery rate of 70% by 2006. According to a document published by the European Lamp Companies Federation, which represents many of the same multi-

national companies as NEMA, “the industry has set up a European-side recycling infrastructure for all gas discharge lamps... capable of recycling mercury, as well as other metals, glass, etc. as part of its obligations under the WEE Directive. See “The Lamp Industry’s Commitment to Support a Government Shift to Energy Efficient Lighting Products in the Home: Questions and Answers,” April 20, 2007; www.elcfd.org/documents/070420_ELC_Q&A_on_Domestic_Lighting.pdf.

We believe that lighting manufacturers, in partnership with retail establishments have a far greater capacity to design a convenient, efficient, and cost-effective fluorescent light collection program than do local or state government. Experience shows that most successful programs are those driven by product manufacturers, where recycling costs are internalized in the product price, similar to the mandates of the European Union’s WEEE Directive. Green Seal can play an important role in helping to make this happen here in the United States.

The Green Seal standard needs more detail about what constitutes an acceptable take-back program. The program should be readily accessible and convenient across the United States. The standard should also require fluorescent lamps to be handled in an environmentally sound way. For example, an acceptable program would include recyclers that have agreed to the “Recyclers Pledge of True Stewardship”; see www.ban.org/pledge/electronics_recycler_pledge.pdf.

Comment:

Manufacturer Support for CFL Recycling Programs. We strongly support the fourth bullet under Section 5.1 of the proposed standard, “Provide a take-back program.” However, this bullet is short on specific requirements for a program that would serve consumers across the country. We strongly recommend that this section be strengthened now and in future versions of the Standard to include specific requirements related to cost, convenience, accessibility, and other program components to encourage manufacturer take-back programs that achieve high rates of recovery.

President Bush signed the Energy Bill into law two days ago. The new law will greatly expand the use of mercury-containing CFLs and other energy efficient lighting that may contain mercury. It is now even more important that manufacturers actively promote, support, and operate lamp recycling programs to reduce improper disposal, and mercury emissions associated with improper disposal, of the increased numbers of lamps.

Comment:

We strongly support lamp recycling at the end of life and are committed to working towards expanding convenient, cost-effective options to increase the lamp recycling rate. However, we have great concerns about the take-back program requirement. While this was likely included to facilitate the recycling of screw-based CFLs, the standard includes both screw-based and pin-based lamps. Pin-based lamps are becoming more widely used in commercial applications, and we can foresee an enormous burden placed on manufacturers should customers begin sending such lamps to our facilities. Some manufacturers have had recycling programs in place for a while, with a simple means of

recycling lamps. Promoting the fact that customers can send lamps to a manufacturer rather than directly to a recycling facility adds both burden and cost.

Response:

The aim of the proposed criterion on lamp recycling was for more CFLs to be recycled. It is well-accepted that recycling of CFLs keeps mercury containing products out of inappropriate waste disposal, thus providing a means to safely recover mercury. However, to be effective, the means for this should be economical for all parties involved. This means that it needs to be sensitive to the limited profit margin on CFLs and that there is already separate industry/businesses recycling CFLs. Further, Green Seal's standards are voluntary and cannot establish a new infrastructure or system that would need enforcement. Relying on municipalities for this service may not be economical for the municipality. As a result, use of third-party or retailers as the collectors and recyclers will be encouraged. The updated criterion will be as follows:

Lamp Recycling. Manufacturers shall have a recycling program in place to encourage and facilitate recycling of lamps in all markets where their CFLs are sold, including at least:

- *Provide direct consumer/customer access to a CFL collector and recycler. This access can include a third-party provider or retailer partnership.*
- *Information on the package, as pursuant to section 8.1.*
- *Information on the company website on the recycling program that directly links consumers/customers to the CFL collectors and recyclers, through a link on the main CFL or lighting page for the company.*

6.1 Recyclable Package

The product's package shall be recyclable.

Comment:

6.1. Recyclable Packaging. Green Seal should provide more clarity on what is considered a recyclable package in order to avoid confusion about what passes the standard and what does not. For example, very little plastic packaging is readily recyclable throughout the United States. PVC packaging is particularly difficult to recycle and should not be considered recyclable under the standard. Also, because PVC packaging can contribute to the formation of dioxins if incinerated, it should be prohibited in the standard.

Comment:

6.1 – Recyclable Packaging This is a vague term. All our packaging is recyclable, but we have no control over whether there is a recycling facility near each one of our customers.

Response:

The definition used for recyclable package is consistent with the Federal Trade Commission's definition of recyclable. As such, recyclable packages would

include paperboard packages. Given that plastic clamshell packages are not accepted by most recycling operations, an option for a source-reduced package will be available for this requirement. This will provide for use of less material options that may not be recyclable. Combination packages could meet the requirement if they were recyclable (paperboard) and the non-recyclable component represents a source reduction of at least 50%. Further, the recyclable requirement was also intended to restrict the use of polyvinyl chloride, thus this will be made more explicit.

Polyvinyl Chloride Package. The package shall not be made from polyvinyl chloride.

Recyclable Package. The product's package shall be recyclable, source-reduced, or a combination of the two.

Source-Reduced Package. A package that has at least 50% less material (by weight) compared to containers commonly used for that product type

6.2 Recovered Material Content

Plastic packaging shall contain at least 25% post consumer material and paperboard packaging shall contain at least 50% recovered or post consumer material.

Comment:

6.2 Recovered Material Content. The Green Seal standard relating to recycled content in packaging should only give credit to products packaged in materials made with post-consumer recycled content. Giving equal credit for packaging made with recovered (i.e., post-industrial) or post-consumer recycled content eliminates the incentive for industry to include post-consumer recycled content in its packaging. Since post-industrial paper is already readily recovered by paper and packaging manufacturers as standard operating procedure, including it in the Green Seal standard would not foster innovation or yield additional environmental benefits. The standard should eliminate the definition of and references to recovered paper. This section should read: Plastic packaging shall contain at least 25% post-consumer material and paperboard packaging shall contain at least 50% post-consumer material.

Comment:

6.2 – Recovered Material Content This is also a bit vague. Which is better – 25% pcm PVC plastic and 50% pcm paperboard, or 0% pcm PET plastic and 100% pcm paperboard? We question whether there might not be another option to allow for each manufacturer's existing and planned processes for conversion of packaging materials to more environmentally responsible components.

Response:

This criterion is intended for post consumer material to be included in whatever packaging type, plastic or paper, is used. Given that there are feasibility differences in incorporating post consumer material into the different types of packaging, the different allowances were provided. The reference to recovered material, as suggested, will be removed. The recovered material content requirement, along with the recyclable requirement (PVC is not allowed, see above comment and response), allow the manufacturer to choose whichever environmentally preferable packaging type works for them. The modified criterion will read as follows:

Post-Consumer Material Content. Plastic packaging shall contain at least 25% post consumer material and paperboard packaging shall contain at least 50% post consumer material.

6.4 Heavy Metal Restrictions

Heavy metals, including lead, mercury, cadmium, and hexavalent chromium, shall not be intentionally introduced. Further, the sum of the concentration levels of these metals present shall not exceed 100 parts per million by weight (0.01%); an exception is allowed for packages that would not exceed this maximum level but for the addition of recovered materials. Further, intentional introduction does not include the use of one of the metals as a processing aid or intermediate to impart certain chemical or physical changes during manufacturing, where the incidental retention of a residual of that metal in the final package or packaging component is not desired or deliberate, if the final package or packaging component complies with the incidental concentration restrictions of 100 ppm.

Comment:

Minnesota has enacted Toxics in Packaging legislation and has contributed to the comments on this subject that are being submitted by the Toxics in Packaging Clearinghouse.

Comment:

We recommend the following changes for clarification and consistency with the Model Toxics in Packaging Legislation on which the laws of 19 US states are based. The Toxics in Packaging Clearinghouse coordinates the implementation of these laws on behalf of 11 member states. For more information on toxics in packaging requirements, see www.toxicsinpackaging.org.

Heavy metals, including lead, mercury, cadmium, and hexavalent chromium, shall not be intentionally introduced into any packaging or packaging component. Further, the sum of the concentration levels of these metals incidentally present in any packaging component shall not exceed 100 parts per million by weight (0.01%). Packaging components include, but are not limited to, inks, dyes, pigments, adhesives, and stabilizers. An exception is allowed for packages that exceed this maximum concentration level only because of the

addition of recovered materials. Further, intentional introduction does not include the use of one of the metals as a processing aid or intermediate to impart certain chemical or physical changes during manufacturing, where the incidental retention of a residual of that metal in the final package or packaging component is not desired or deliberate, if the final package or packaging component complies with the incidental concentration restrictions of 100 ppm.

Comment:

6.4 Heavy Metal Restrictions. The standard should not allow toxic chemicals in packaging, even if it comes from recycled material due to hazards to workers and consumers from lead and other toxic chemicals of concern. There is no easy way to discern where the heavy metals in packaging originate from, so this exemption would effectively undercut this requirement. The risk to workers due to exposure to lead, cadmium and hexavalent chromium outweighs the benefit of having a small amount of recycled content included in the package.

We support most of the comments above, which recommends that "heavy metals, including lead, mercury, cadmium, and hexavalent chromium, not be intentionally introduced into any packaging or packaging component" and that "the sum of the concentration levels of these metals incidentally present in any packaging component shall not exceed 100 parts per million by weight (0.01%)."

Response:

Heavy metal restrictions were modeled from the Model Toxics in Packaging Legislation used by a number of states. They do allow for exemptions for heavy metal content already present in recovered content. Without this exemption, use of recovered content, namely post-consumer material, may be restricted. The modified criterion is as follows:

Heavy metals, including lead, mercury, cadmium, and hexavalent chromium, shall not be intentionally introduced. Further, the sum of the concentration levels of these metals present shall not exceed 100 parts per million by weight (0.01%); an exception is allowed for refillable packages or packages that would not exceed this maximum level but for the addition of recovered materials. Further, intentional introduction does not include the use of one of the metals as a processing aid or intermediate to impart certain chemical or physical changes during manufacturing, where the incidental retention of a residual of that metal in the final packaging or packaging component is not desired or deliberate, if the final packaging or packaging component complies with the incidental concentration restrictions of 100 ppm.

7.0 Labeling Requirements

7.1 The Green Seal Certification Mark may appear on the packaging and may appear on the product itself.

7.2 The Green Seal Certification mark shall not be used in conjunction with any modifying terms, phrases, or graphic images that might mislead consumers as to the extent or nature of the certification.

7.3 Whenever the certification mark appears on a package or product, the product or package must contain a description of the basis for the certification. The description shall be in a location, style, and typeface that are easily readable by the consumer. Unless otherwise approved in writing by Green Seal, the description shall read as follows:

This product meets the Green SealTM Environmental Standard requirements for energy efficient lamps for energy efficiency, low mercury content, and a recyclable package.

Comment:

7.0 Labeling Requirements. We suggest that the wording next to the Green Seal logo also include “long life” and lead-free (if that requirement is included) when referring to the lamp. It should also make reference to the fact that a manufacturer-financed collection and recycling program is available and explain how that program works (rather than pointing them to an EPA website or telling consumers to vague contact local authorities). The label should also include information about the mercury content of the lamp in milligrams.

Comment:

These are logo use guidelines, not product standards. These should not be included in the standard.

Response:

The use of the logo guidelines will be removed, but the explanatory text will remain to provide clarity on how the standard and claims about meeting the standard comply with the FTC Green Guides. The explanatory text will be more descriptive and reflect the modifications made in the standard since the last edition.

Certification. Whenever a claim on the product or package that it has been certified to this standard, it shall be based on a third-party certification program with an on-site audit and a description of the basis of certification shall be in a location, style, and typeface that are easily readable by the consumer and unless otherwise approved in writing by Green Seal, the description shall read as follows:

“This product meets the Green SealTM Environmental Standard for Compact Fluorescent Lamps for energy efficiency, long-life, low mercury content, and in a package with post-consumer content.

8.0 Product Information Labeling Requirements

General comments or idea about labeling requirements.

Comment:

Include estimated life, CRI and degrees K, inc. warm, white and cool, in layman's language.

Comment:

8.0 Product Information Labeling Requirements

8.1.1.4. The comparison with the nearest incandescent lamp should be made with the MEAN or DESIGN lumen output of the compact fluorescent lamp, not with its INITIAL lumen output. That way, the CFL will be at least as bright as the incandescent it is replacing for at least 40% of its life. Even better, require manufacturers to report the bulb's anticipated lumen output closer to the end of its life (and match the incandescent lumen output to the end-of-life lumen output) to ensure that the CFL will perform well the entire time it is used. Incandescent bulbs tend to emit a relatively constant amount of light throughout their short life, while CFLs experience substantial "lumen depreciation". This means that they fade over time.

8.1.1.6. The language on the packaging relating to mercury and recycling should be more clearly delineated in the Green Seal standard. What is included in the proposed standard is no improvement over what has been voluntarily adopted by NEMA. Green Seal could play an important role in facilitating environmentally sound consumer choices by requiring the manufacturers of Green Seal-certified lamps to print the numerical mercury content of the lamp on the packaging and lamp. And rather than pointing consumers to "local authorities", the packaging should describe the manufacturer's recycling collection program in detail and how that can be accessed.

Comment:

Product Information Labeling Requirements

Regarding the incandescent equivalency comparison in sub-section 8.1.1.4, NEMA would like to call your attention to the Energy Star requirements for CFLs which already has an equivalency table. Rather than have two possibly different comparisons required on the packaging, we would suggest that Green Seal adopt the equivalencies as specified in Energy Star. Regarding subsection 8.1.1.6, NEMA strongly disagrees with the proposal to require manufacturers to reference www.epa.gov/bulbrecycling on their packages. As you know, 1) there is limited space on the package on which to place consumer information and 2) packaging changes are costly and in themselves not particularly environmentally friendly. NEMA lamp (and luminaire) manufacturers have in recent years and months implemented nationwide changes to their package labeling to indicate the presence of a mercury-containing lamp, to advise the consumer that recycling and disposal requirements exist, and to direct the consumer to an established non-governmental website, www.lamprecycle.org, for more information. This labeling scheme was worked out cooperatively through years of negotiations with state regulators.

As a result, use of the lamprecycle.org website is currently an element of state labeling requirements that manufacturers cannot change simply on our own initiative. Since our manufacturers do not label product for one state, the scheme has been adopted as best practice and implemented nationwide. The site www.lamprecycle.org, which has existed for several years and is a well-known resource for lamp consumers of all kinds, is promoted actively not only by lighting manufacturers but also by state and local governments, and contains a prominent hyperlink to this new EPA website, www.epa.gov/bulbrecycling. NEMA respectfully suggests that Green Seal allow manufacturers the option of referencing the PA website or www.lamprecycle.org.

Comment:

While we understand Green Seal's interest in promoting environmental information to consumers, we are concerned about the specificity of the standards with respect to the labeling requirements. Because we sell CFLs throughout NAFTA, our packaging requires translation into both Spanish and French. Furthermore, there are legal language requirements that take precedence. And certainly it's in everyone's interest to convey the energy savings benefits messages to consumers. Requiring certain language appear on certain panels limits manufacturers' ability to convey the necessary messaging and may actually result in fewer lamps sold. Changing packaging is time-consuming and expensive, which may increase the cost of the product. All the information included in this section currently appears on CFL packaging but in different locations, depending upon the size of the packaging. As CFLs become smaller in size, they provide significant external environmental benefits—more product on a pallet and more pallets on a truck equate to a reduction in trucking needs. By shifting from plastic packaging to our recycled paperboard Smart Pack packaging, we reduced transportation-related air emissions by 30% for a single product! Not to mention the reduction in natural resources and all the environmental benefits that go along with that. The downside of these smaller lamps is that there is less and less space on the box/package for information. In some instances, we are forced to utilize the bottom and tops of the box. Restricting our use of parts of the packaging may actually jeopardize our ability to meet federal labeling requirements.

Response:

The specific language required on the label has been aligned with the ENERGY STAR program. For example, the ENERGY STAR program includes labeling of the average rated life, lumen output, and correlated color temperature among others. The additional labeling required for the Green Seal standard is limited and specific language was not included, but examples were provided for guidance. The additional labeling requirements include the color rendering index. Mercury labeling is required in the ENERGY STAR requirements. This standard will have additional requirements for labeling of safe handling of broken product and recycling instructions.

Color Rendering Index. The Color-Rendering Index shall be included on the product packaging as measured in accordance with the ENERGY STAR Program Requirements for CFLs.

Mercury. If the lamp does not contain mercury, it does not need to include the mercury labeling requirements in the ENERGY STAR Program Requirements for CFLs. For products that contain mercury, in addition to the requirements in the ENERGY STAR Program Requirements for CFLs, the following shall be included:

- If lamp breaks, do not inhale. Open window, leave room, and close door behind you. Shut off air system. Stay away for 20 minutes. With gloves or plastic bags to protect hands, scoop up broken material with stiff paper or cardboard and seal in plastic bag or container with lid. Clean area with damp paper towels and seal in a separate plastic bag or container, include gloves. Dispose of properly. Wash hands thoroughly. Do not allow children or pregnant/nursing women to help with cleanup. Do not vacuum or sweep.*

8.1.1. Primary Packaging Information

The following shall be displayed on the front face (the package side intended to face forward in merchandising) or adjacent side panels (not top, bottom, back or flaps) of the individual product sales packaging.

8.1.1.1 Total input watt rating, as specified in section 3.1.2.

8.1.1.2 Average initial lumen output, as specified in section 3.1.1.

8.1.1.3 Average rated life, as specified in section 3.2.

8.1.1.4 Comparison to nearest incandescent lamp wattage with equivalent lumen output within 10% maximum deviation (soft white, 750-1000 hour, A-19 or A-21, R20, R30, or R40 lamp as appropriate).

8.1.1.5 Correlated color temperature, as specified in section 4.2.

8.1.1.6 The words “contains mercury, dispose of properly, can be recycled” and “for more information contact customer service at 1800-xxx-xxxx, www.epa.gov/bulbrecycling, or local authorities”)

8.1.1.7 Warranty information, with the words “Two-year warranty, contact customer service at 1-800-xxx-xxxx.” Alternatively, a mailing address and web site can accompany this information.

8.1.1.8 “Optimal operating temperature is XX°F (YY°C), light output reduces at other operating temperatures.” This may be written as a temperature range.

8.1.1.9 “Minimum and maximum operating/starting temperatures of XX°F (YY°C)”, as specified in section 4.3.

Comment:

8.1.1.6 – This section is currently being addressed on a national level. The language recommended by Green Seal is included as part of a state law in Vermont and several other states that adopted the language in Vermont’s law. However, the agreed-upon website in that regulation is “www.lamprecycle.org.” Requiring a different website would force manufacturers out of compliance with several state regulations. Furthermore, the EPA website is a link on the lamprecycle.org site.

8.1.1.8 – Again the term “optimal” is vague. Manufacturers already provide a minimum and maximum operating/starting temperature range (as in 8.1.1.9), which we feel is sufficient information. We suggest that this section be eliminated.

Response:

This section will be aligned with the ENERGY STAR program requirements.

ENERGY STAR Compliance. Lamps shall meet or exceed all of the ENERGY STAR Program Requirements for CFLs

8.3 Applications Information

The following information (or equivalent language) on the recommended use of the product shall be displayed on the individual product sales packaging, if applicable.

8.3.1“Possible dimension fit problem with some common luminaries.”

8.3.2“Not for use in enclosed fixtures”

8.3.3“Not recommended for use with photo-control devices.”

8.3.4“Reduced mechanical stability possible with freestanding luminaries.”

8.3.5Replacement parts listing.

8.3.6“Not for use with 2-way, 3-way, or dimmable fixtures.”

Comment:

Possible additions:

Requires approximately one second to start.

Requires approximately one minute to attain full brightness.

Comment:

8.3 – Applications Information

The term “if applicable” in the first sentence is extremely vague. Does that mean that a manufacturer can comply with the standard if it makes the determination that the six statements are not applicable? Furthermore, the statements are too prescriptive and should allow for manufacturer-specific information.

8.3.3 – the appropriate term is “photo-cell”

8.3.4 – This statement is outdated (it’s 16 years old) and does not apply, given newer CFL designs.

Response:

The starting time and run-up time will not be required for labeling since this is not an exceptional characteristic of the product. The standard was modified to be aligned with the ENERGY STAR program requirements. The ENERGY STAR program includes application exception labeling requirements, thus the areas of overlap will be removed from this standard. However, the following exceptions will be noted in this standard since they were not explicitly included in the ENERGY STAR program requirements:

Application Exceptions. In addition to the requirements in the ENERGY STAR Program Requirements for CFLs, the following shall be included (or equivalent language) when applicable.

- *“Possible dimension fit problem with some common luminaries.”*
- *“Not for use in enclosed fixtures”*
- *“Reduced mechanical stability possible with freestanding luminaries.”¹*
- *Replacement parts listing.*
- *“Not for use with 2-way, 3-way, or dimmable fixtures.”*

Addendum

Green Seal Criteria for Verification of Optional Claims for GS-5 Certified Energy Efficient Lighting

A.SCOPE

This criteria document establishes environmental requirements for optional verified claims on GS-5 certified products. Verification applications must be reviewed during the initial application for GS-5 certification.

There is emphasis on demonstrated leadership in the following environmental

¹ Refer to ANSI C78.5-1991, *Fluorescent self-ballasted lamps-performance guide*, for guidance.

impact areas: energy reduction, waste reduction, resource minimization (including water), emissions reduction, and biodiversity conservation.

B.DEFINITIONS

B.1 Carbon offsets: mitigation of greenhouse gas emissions generated using reduction measures that may be purchased from a third-party carbon offset provider.

B.2 Greenhouse gas (GHG): Components of the atmosphere that contribute to the greenhouse effect including water vapor, carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, perfluorocarbons, chlorofluorocarbons, and ozone.

B.3 Renewable energy: energy from non-depleting sources and derived from natural processes that are replenished constantly including wind, solar, water, geothermal, and biofuels.

C.CLAIM CRITERIA

C.1 Lead-Free: A product will be verified to contain no lead in the product when all components have no measureable amounts of lead in the product.

C.2 Made with Green Energy: A product shall be verified to be manufactured with green energy if the energy requirements for product and package production was directly fueled with a minimum of 75% with renewable energy, not including any renewable energy certificate purchases.

C.3 Lamp Lifetime GHG Emissions Offset: A product shall be verified to have the lamp lifetime (at least 10,000 hours) greenhouse gas emissions offset by the manufacturer. This can be done through carbon offsets.

C.4 Made with Zero GHG Emissions: A product shall be verified to be manufactured with zero greenhouse gas emissions during production of the product and package. This can be achieved within the company, with proven partnerships, or through carbon offset programs. If a carbon offset program is used for 100% of the emissions, a successful emissions reduction program must be demonstrated, with 10% or greater annual reductions in emissions.

D.LABELING REQUIREMENTS:

D.1The verification claim may only appear on packaging, literature, or marketing materials for GS-5 certified products.

D.2The verification claim shall not be used in conjunction with any modifying terms, phrases, or graphic images that might mislead consumers as to the extent or nature of the verification.

D.3 Whenever the verification claim appears on a package, the package shall contain a description of the basis for the claim verified along with the description of the basis of certification. The description shall be in a location, style, and typeface that are easily readable; shall be on the same side of the product label as the Green Seal certification mark; and not detract from the Green Seal certification mark. Unless otherwise approved in writing by Green Seal, the description shall, as applicable, read as follows:

Lead-Free: This product meets the Green Seal™ Environmental Standard requirements for energy efficient lamps for energy efficiency, low mercury content, and a recyclable package. This product was also verified to contain no measurable amounts of lead.

Made with Green Energy: This product meets the Green Seal™ Environmental Standard requirements for energy efficient lamps for energy efficiency, low mercury content, and a recyclable package. This product was also verified to have been manufactured with at least 75% renewable energy.

Lamp Lifetime GHG Emissions Offset: This product meets the Green Seal™ Environmental Standard requirements for energy efficient lamps for energy efficiency, low mercury content, and a recyclable package. This product was also verified to have the lifetime of the lamps greenhouse gas emissions offset by the manufacturer.

Made with Zero GHG Emissions: This product meets the Green Seal™ Environmental Standard requirements for energy efficient lamps for energy efficiency, low mercury content, and a recyclable package. This product was also verified to have been manufactured with no net greenhouse gas emissions.

Comment:

The overriding advantages of CFL's are 4X efficiency and 13X life, resulting in the reduction of fossil fuel use, resource use, transportation needs and landfill needs. The layman usually knows only that CFL's save electricity. The total savings need to be presented up front and prominently.

Comment:

Given the FTC's proposed review of carbon offsets, we recommend that Green Seal not include them in this standard. Should Green Seal allow statements that the FTC later deems unlawful, the user of the Green Seal label would hold liability and this could result in significant costs to pull product from shelves and change packaging and collateral materials. C. Claim Criteria – the term “measurable” is not defined and it is another vague term that should not be in a standard unless there is a guideline for testing. C.4 Made with Zero GHG Emissions – This is a misuse of the term. Unless a product is manufactured completely using renewable energy, it is made with ghg emissions. These emissions are proposed to be offset, but again the FTC review of this term becomes an issue. It is our suggestion that optional claims be eliminated from this standard.

Response:

This addendum section will be removed from this standard. Green Seal will verify claims made on certified products and consider developing common definitions for newer claims (e.g. GHG reduction), which can be used for all Green Seal certification (those included in the scope of this standard as well as all the other standards).

General Comments

General comments, questions or ideas shall be submitted here.

Comment:

Overall:

- We understand that Green Seal’s interest is in offering a label/standard that covers multiple attributes beyond energy efficiency. However, we wonder why the ENERGY STAR criteria were not considered as a baseline. The Green Seal CFL criteria were initially developed prior to the ENERGY STAR specifications, which made quite a bit of sense back in 1992 when there was no other environmental label. However, ENERGY STAR has become the nationally accepted “standard” for CFLs. Manufacturers are spending a great deal of time and money to comply with the Energy Star specifications. Energy Star is also considering, or has considered, many of the provisions suggested by Green Seal that are outside the energy efficiency “single attribute” of the ENERGY STAR label, including mercury and power quality. We feel that Energy Star should be supported nationally by groups such as Green Seal.
- To that extent, we recommend that the following requirements in GS-5 be replaced with either a phrase similar to “must meet the current ENERGY STAR requirements” or specific language from the latest ENERGY STAR version of specifications:
 - o Efficacy
 - o Life
 - o Cycle Life
 - o Power Quality
 - o Safety
 - o Warranty
- If it is the intent of Green Seal to offer a label that manufacturers will widely adopt, and expand communication of environmental attributes via a label, the criteria for the use of the label/standard should apply to a wide range of products, rather than an extremely narrow niche as is the current focus of the standard as it is written.
- Another general observation is that there are many uses of fairly vague terms that leave interpretation open to the imagination. A standard should have very specific, solid, enforceable language so there is no degree of variation between products. These terms are identified in the comments below.
- Several terms, descriptions and phraseologies used in the document are not consistent with what is generally accepted by today’s US standards, regulatory or guideline bodies.
- Finally, many of the references are from the EU. European lamps have a different set of measurements and test procedures. Furthermore, they operate differently than they do in

the US and are manufactured differently. Our recommendation is to use only US sources for all references, measurements and test procedures.

Title: Should remain "Compact Fluorescent Lighting" not "Energy Efficient Lighting" as there are other energy efficient lighting solutions not covered in this standard.

Response:

Green Seal will align its performance requirements with the ENERGY STAR requirements and use this as a baseline requirement. Additional, important life cycle considerations will remain in the standard to help identify the environmental leaders in the market place. The title of the standard will be changed to CFLs to reflect the scope of the standard.